

REMARKS

Applicant has carefully reviewed and considered the final Office Action mailed on June 11, 2003, and the Advisory Action mailed on July 10, 2003.

No claims are canceled. New claims 43-58 are added. As a result, claims 1-58 are now pending in this application.

Amendment of the Abstract

The Abstract has been amended as shown in the marked-up version shown above. A clean copy of the Abstract is also submitted herewith.

Amendments to the Specification

Applicant has carefully reviewed the entire specification and made a number of edits to correct grammatical errors and typos.

Applicant has also made several amendments to the specification by deleting wording that refers to the “invention” without referring to one or more embodiments of the invention, and by substituting “embodiments of the invention” or “inventive subject matter” for “invention” or “present invention”.

In the paragraph beginning on page 2, line 5, the sentence “Such embodiments of the inventive subject matter may be referred to, individually and/or collectively, herein by the term ‘invention’ merely for convenience and without intending to voluntarily limit the scope of this application to any single invention or inventive concept if more than one is in fact disclosed.” has been inserted.

In the paragraph beginning on page 4, line 23, the language “via pins or connectors onto a mounting assembly or socket assembly 120” has been substituted for “via pins onto a socket assembly 120” to provide antecedent basis for the language “connectors” and “mounting assembly” in new claim 43.

In the paragraph beginning on page 8, line 21, the language “conductive patterns in the form of” has been inserted before “power and ground plane, pad, and via locations compatible

with the shunt(s)". Support may be found, for example, on page 8, lines 6-10, and in the paragraph beginning on page 9, line 4, as amended.

In the paragraph beginning on page 9, line 4, reference has been made to "top view 400", in order that each reference numeral of the drawings be mentioned in the written description.

In the paragraph beginning on page 9, line 9, two additional sentences have been added for the purpose of defining a "conductive pattern". Support may be found, for example, in FIG. 5 and the corresponding original written description of FIG. 5.

No new matter has been introduced through these amendments to the specification.

Amendments to Claims 1, 3, 9, 11, 17, 28, 34, and 39-42

Claims 1, 3, 9, 11, 17, 28, 34, and 39-42 have been amended. The amendments to these claims are supported by the original disclosure. No new matter has been introduced.

In independent claims 1, 17, and 28, language has been added to recite that "at least part of said shunt/support member to extend within one of said electrical components so as to provide the at least one electrical conduction path". Support may be found, for example, in FIGS. 5, 7, 9, and 11, and in the corresponding original written description.

Additionally, in independent claim 17, the phrase "a first" has been substituted for "two"; the phrase "component and a second discrete electrical component, said first and second discrete electrical components being" has been substituted for "components" (first occurrence); and the phrase "first and second" has been inserted before "electrical components" (second and fourth occurrences, respectively).

In dependent claims 3 and 11, the word "PCB" has been deleted.

In independent claim 9, the language "by a grid array that contacts a first one of the discrete electrical components and a second one of the discrete electrical components" has been substituted for "with a grid array". Also, the phrase "first one of the" has been inserted before "electrical components" (fourth occurrence); the phrase "and to directly contact the second one of the electrical components" has been inserted after "electrical components" (fourth occurrence); and the phrase "first and second" has been inserted before "electrical components"

(sixth occurrence). Support may be found, for example, in FIG. 3 and in the corresponding original written description.

In dependent claim 34, the word “arrangement” has been deleted from the preamble.

In dependent claims 39-42, the word “at” has been substituted for “as”.

New Claims 43-58

New claims 43-58 are submitted. New claims 43-58 are supported by the original disclosure. No new matter has been introduced. Applicant will now discuss new claims 43-58 in detail.

New independent claim 43 is directed to an apparatus. The apparatus comprises a **semiconductor package including a die and a plurality of connectors electrically coupled to the die, wherein the plurality of connectors are formed in an array on a surface of the semiconductor package, and wherein the surface comprises a first plurality of conductive patterns**. Support for “connectors” and “array” may be found, for example, in the paragraph beginning on page 4, line 23, as amended. Support for “conductive patterns” may be found, for example, on page 8, lines 7-9, and in the paragraph beginning on page 9, line 9, as amended.

Still referring to independent claim 43, the apparatus further comprises a **receiving substrate including a mounting assembly to receive the plurality of connectors, wherein the receiving substrate comprises a second plurality of conductive patterns**. Support for “receiving substrate” may be found, for example, on page 7, line 3. Support for “mounting assembly” may be found, for example, in the paragraph beginning on page 4, line 23, as amended. Again, support for “conductive patterns” may be found, for example, on page 8, lines 7-9, and in the paragraph beginning on page 9, line 9, as amended.

Still referring to independent claim 43, the apparatus further comprises a **plurality of shunts electrically and physically coupled between corresponding ones of the first and second plurality of conductive patterns, wherein individual ones of the plurality of shunts have a cross-sectional area and a current-carrying capacity greater than that of any one of the plurality of connectors**. Support for “cross-sectional area” may be found, for example, on

page 8, lines 13-14, and support for “current-carrying capacity” may be found, for example, on page 7, line 1.

New dependent claim 44 recites that the array includes a reserved component area, and wherein the plurality of shunts are within the reserved component area. Support may be found, for example, in original claim 4.

New dependent claim 45 recites that the array includes a reserved component area, and wherein at least one of the plurality of shunts is within the reserved component area. Support may be found, for example, in FIGS. 4 and 6.

New dependent claim 46 recites that the array includes a reserved component area, and wherein none of the plurality of shunts are within the reserved component area. Support may be found, for example, in FIGS. 8 and 10.

New dependent claim 47 that the shunts are to conduct power and ground current from the second plurality of conductive patterns on the receiving substrate to the first plurality of conductive patterns on the semiconductor package. Support (regarding the problem) may be found, for example, in the paragraph beginning on page 5, line 23, and support (regarding a solution) may be found in the paragraph beginning on page 7, line 21.

New dependent claim 48 that at least one of the plurality of shunts is hollow. Support may be found, for example, in FIG. 6.

New dependent claim 49 that at least one of the plurality of shunts has a frame-like structure with an open center portion. Support may be found, for example, in FIG. 6.

New dependent claim 50 that at least one of the plurality of shunts has a frame-like structure with an open center portion to accommodate components to be mounted therein. Support may be found, for example, in FIG. 6 and on page 10, lines 8-9.

New dependent claim 51 that at least one of the plurality of shunts includes an extension on one end, and wherein one of the semiconductor package and the receiving substrate has at least one corresponding hole to receive the extension. Support may be found, for example, in FIG. 5 and in the paragraph beginning on page 9, line 24.

New dependent claim 52 that at least one of the plurality of shunts includes an extension on each end, and wherein the semiconductor package and the receiving substrate have at least

one corresponding hole to receive the respective extension. Support may be found, for example, in FIG. 5 and in the paragraph beginning on page 9, line 24.

New dependent claim 53 that at least one of the plurality of shunts includes at least one conductive portion separated by at least one insulating portion. Support may be found, for example, on page 10, lines 11-14.

New dependent claim 54 that at least one of the plurality of shunts extends completely through the semiconductor package. Support may be found, for example, in FIG. 11 and on page 11, lines 20-22.

New dependent claim 55 that at least one of the plurality of shunts extends completely through the semiconductor package and the receiving substrate to fasten the semiconductor package to the receiving substrate. Support may be found, for example, in FIG. 11 and on page 11, lines 20-22.

New dependent claim 56 that at least one of the plurality of shunts is circular in cross-section. Support may be found, for example, in FIG. 10.

New dependent claim 57 that at least one of the plurality of shunts is rectangular in cross-section. Support may be found, for example, in FIG. 10.

New dependent claim 58 that the plurality of connectors comprises pins, and wherein the mounting assembly comprises sockets. Support may be found, for example, in FIG. 4, and on page 9, lines 6-7.

Claim Objections

Claims 39-42 were objected to by the Examiner, because the Examiner asserted that the phrase “at least” should be substituted for “as least”. Applicant expresses appreciation to the Examiner for pointing this out, and claims 39-42 have been amended accordingly.

Rejection of Claims 1-42 under 35 U.S.C. §102(e) as Anticipated by Figueroa

Claims 1-42 were rejected under 35 U.S.C. §102(e) as being anticipated by Figueroa (U.S. Patent No. 6,388,207).

Applicant respectfully asserts that the §102(e) rejection of the claims as anticipated by Figueroa is inappropriate, because the subject matter disclosed in Figueroa does not represent the invention “by another”, as required by §102(e).

Submitted herewith is a declaration under 37 CFR §1.132 executed by the inventor of the present application, declaring that he conceived the subject matter disclosed in the Figueroa patent.

“When subject matter, disclosed but not claimed in a patent application filed jointly by S and another, is claimed in a later application filed by S, the joint patent or joint patent application publication is a valid reference available as prior art under 35 U.S.C. §102(a), (e), or (f) unless overcome by affidavit or declaration under 37 C.F.R. 1.131 shown prior invention (see MPEP §715) or an unequivocal declaration by S under 37 C.F.R. 1.132 that he or she conceived or invented the subject matter disclosed in the patent or published application and relied upon in the rejection.” *In re DeBaun*, 687 F.2d 459, 214 USPQ 933 (CCPA 1982). See MPEP §715.01(a) and §716.10.

In view of the §1.132 declaration, Applicant respectfully submits that the rejection is now moot and should be withdrawn, and that claims 1-42, as well as new claims 43-58, are allowable.

Additional Elements and Limitations

Applicant considers additional elements and limitations of claims 1-58 to further distinguish over the cited references, and Applicant reserves the right to present arguments to this effect at a later date.

Documents Cited But Not Relied Upon For This Office Action

Applicant need not respond to the assertion of pertinence stated for the references cited but not relied upon by the Office Action, because these references are not made part of the rejections in this Office Action. Applicant is expressly not admitting to this assertion and reserves the right to address the assertion should it form part of future rejections.

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.116 – EXPEDITED PROCEDURE

Serial Number: 10/090,796

Filing Date: March 6, 2002

Title: SHUNTING ARRANGEMENTS TO REDUCE HIGH CURRENTS IN GRID ARRAY CONNECTORS

Assignee: Intel Corporation

Page 27

Dkt: 884.A87US1 (INTEL)

Conclusion

Applicant respectfully submits that claims 1-58 are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney, Walter W. Nielsen (located in Phoenix, Arizona) at (602) 298-8920, or the below-signed attorney (located in Minneapolis, Minnesota) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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Date Oct. 13, 2003

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop RCE, Commissioner of Patents, P.O. Box 1450 Alexandria, VA 22313-1450, on this 14 day of October, 2003.

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Signature